

REMARKS

Upon entry of the present amendments, claims 68-91 and 94 will be pending in the above-identified application. Claims 92 and 93 have been canceled without prejudice to Applicants' right to prosecute the subject matter of the claims in a related application. Claims 91 and 94 have been amended. Claim 91 has been amended to include the elements previously presented in originally filed claim 93. Claim 94 has been amended to more correctly reflect dependency from claim 91. As such, no new matter has been added by these amendments.

Applicant gratefully acknowledges the Examiner's indication that claims 68-90 are allowable pending resolution of the non-statutory double patenting rejection.

Rejections under 35 U.S.C. §103

Claims 91-94 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wu *et al.* (U.S. Patent No. 5,338,198) in view of Yoon *et al.* (U.S. Patent No. 5,742,700) and Andreiko *et al.* (U.S. Patent No. 5,395,238).

Applicant initially points out that while Applicant respectfully disagrees with the rejections and does not acquiesce to any reasoning provided by the Examiner, claim 91 has been amended to further clarify certain distinctions with the cited references and to expedite prosecution. Furthermore, claims 92 and 93 have been canceled herein without prejudice or disclaimer.

Applicant submits that the cited references of Wu, Yoon and Andreiko, taken alone or in combination, fail to teach each and every element of the currently claimed invention, thereby precluding a finding of *prima facie* obviousness. see, e.g., MPEP § 2143. In particular, the cited references fail to teach applying a test to a 3D dataset to identify data elements lying on a gingival boundary that occurs where the tooth and the gum tissue meet, and the cited references certainly fail to teach where applying the test to identify data elements on the gingival boundary includes creating a series of roughly parallel 2D planes, each intersecting the dentition roughly perpendicular to an occlusal plane of the dentition, and each including data elements that represent a cross-sectional surface of the dentition, as well as other elements recited in claim 91.

Wu teaches preparing a 3-D model of a patient's teeth by taking molded impressions of the teeth, placing the impressions on a support table, define an X-Y plane and detecting the Z distance from a probe by directing a beam of laser light onto the impression and calculating from the pattern of reflected light a center of the light falling on an area array. Although Wu generally mentions the term "segmentation", no specifics are provided in the teachings of Wu.

The cited Yoon reference adds little to the teachings of Wu. Yoon teaches gradient method analysis of 2-dimensional X-ray images to detect boundaries of tooth enamel and dentin tissues for the purpose of detecting dental carries. Yoon teaches neither 3-D images in general, nor applying a test to a 3-D dataset to identify data elements lying on a gingival boundary in particular, or other elements recited in claim 91.

Moreover, one of ordinary skill would have no reason or motivation to combine the teachings of Yoon with those of Wu in the first place, as the two systems of Wu and Yoon are fundamentally distinct. Wu teaches light scanning the outer contours of an impression to create a 3-D model. Yoon focuses on inner tooth tissues (enamel/dentin) by analysis of 2-D X-ray radiographs. There is no support for combining the 2-D X-ray analysis of enamel and dentin of Yoon with the very different 3-D model, light scanning production of Wu. Not only is there no support for making the proposed combination, but there is no support to indicate that such a combination is even possible. Even assuming, for arguments sake only, that the references could be combined (even though there is no support for making the combination or reasonable expectation of successfully combining the references), the proposed combination would also still fail to teach applying a test to a 3D dataset to identify data elements lying on a gingival boundary, as both Wu and Yoon are silent with respect to the gingival boundary.

Andreiko fails to provide the teachings that are missing from Wu and Yoon. As previously made of record, Andreiko teaches determining tooth parameters including tooth-gum intersection parameters, the determination taught by Andreiko is occurs prior to conversion of a model to a digital model. Andreiko teaches first physically determining parameters from a conventional model of a patient's mouth (i.e., not a 3D dataset), and subsequently converting the

physically determined parameters into digital data (see, e.g., Andreiko, col. 3, lines 1-7 and 18-21; col. 5, lines 1-14 and 38-41). Andreiko fails to teach applying a test to a 3D dataset to identify data elements lying on a gingival boundary that occurs where the tooth and gum tissue meet, as recited in claim 91.

Additionally, none of the cited references, either alone or in combination, teach the specific test to a 3D dataset to identify data elements lying on a gingival boundary, where the test includes creating a series of roughly parallel 2D planes, each intersecting the dentition roughly perpendicular to an occlusal plane of the dentition, and each including data elements that represent a cross-sectional surface of the dentition, as recited in current claim 91. As such, the cited references fail to teach or suggest each and every element of the claimed invention, thereby failing to establish *prima facie* obviousness.

For the reasons set forth above, Applicant believes that the Office has failed to establish that the current claims would have been *prima facie* obvious in view of the cited references. Accordingly, withdrawal of the rejections of claims 91-94 under 35 U.S.C. § 103(a) is respectfully requested.

Double Patenting

Claims 68-94 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-58 of U.S. Patent No. 6,409,504.

Applicant submits herewith a terminal disclaimer in compliance with 37 C.F.R. §1.321(c), thereby overcoming the double patenting rejection. Accordingly, withdrawal of rejections based on the non-statutory obviousness-type double patenting is respectfully requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 206-467-9600.

Respectfully submitted,

Date: _____

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